

# *Colorado Wind and Distributed Energy Workshop*



Distributed Energy Day -- Apr. 9th

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# *Net Metering and Interconnection*



- 2 different components
- Both are critical if DG is to become widespread
- Net metering important for small customers
- Interconnection important for all non-utility generation

# *Interconnection*



- Definition
- Issues
- Federal Activities
- State Activities

# *Definition of Interconnection*

- The ongoing operation of a customer owned generator that is synchronized to the electric grid and capable of exporting power
  - Involves electrical engineering studies - power flows
  - protective equipment

## *Issues*

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- Rules for all types of generators are complex
- Rules vary from state to state and utility to utility
- Rules for 100MW and larger generators sometimes are applied to small customer owned generation

# *Federal Interconnection Activities*



- Senate S.517
  - would include general interconnection guidelines
- FERC ANOPR
  - Issued in October 2001
  - Negotiations until Jan. 2002
  - Consensus document filed
  - NOPR Expected

# *FERC Interconnection Details*

- Would standardize interconnection for all generator interconnections
- FERC suggested expedited procedures for small generators under 20 MW - no fees
- Small Generator representatives detailed the 20 MW exemption for:
  - 2 to 20 MW | 250kW to 2 MW | below 250kW

# *FERC Interconnection - Small Generator Proposal*

- 2 to 20 MW would receive expedited treatment provided no impacts on the transmission system are identified
- 250kW to 2MW “pre-certified” systems would receive interconnection studies at no cost and expedited treatment
- 250 kW and below must be “pre-certified”. Also no fees plus simple contract



# *FERC Interconnection - Small Generator Proposal*



- Would apply to all FERC regulated generators (no existing standard for small generators)
- Would not allow net metering
- Would not affect state interconnection rules or net metering for state regulated activities

# *State Interconnection Activities*



- Many states have partial interconnection rules -- most related to net metering
- Few states address all interconnections (CA, DE, TX, NY?)
- Several states considering additional interconnection rules

# *State Interconnection Activities*



- Most states leave interconnection up to the individual utility
- NARUC considering model interconnection rule
- IEEE 1547 and 929 are involved as technical | UL and NEC also have rules/policies for interconnection

# *Interconnection - What is needed*



- “Plug and Play”

# *Net Metering*



- Definition
- Issues
- Federal Activities
- State Activities

## *Definition*

- The use of a single meter (typically) to measure the total consumption of an electricity consumer against their total on-site generator production (inside the fence or behind the meter) over a fixed period of time.

# *Net Metering*

- Standard old fashioned meter works just fine

Look out  
for  
electronic  
meters



# *Net Metering Issues*



★ Why is it needed?

★ Economics

✍ customer

✍ utility

✍ other ratepayers



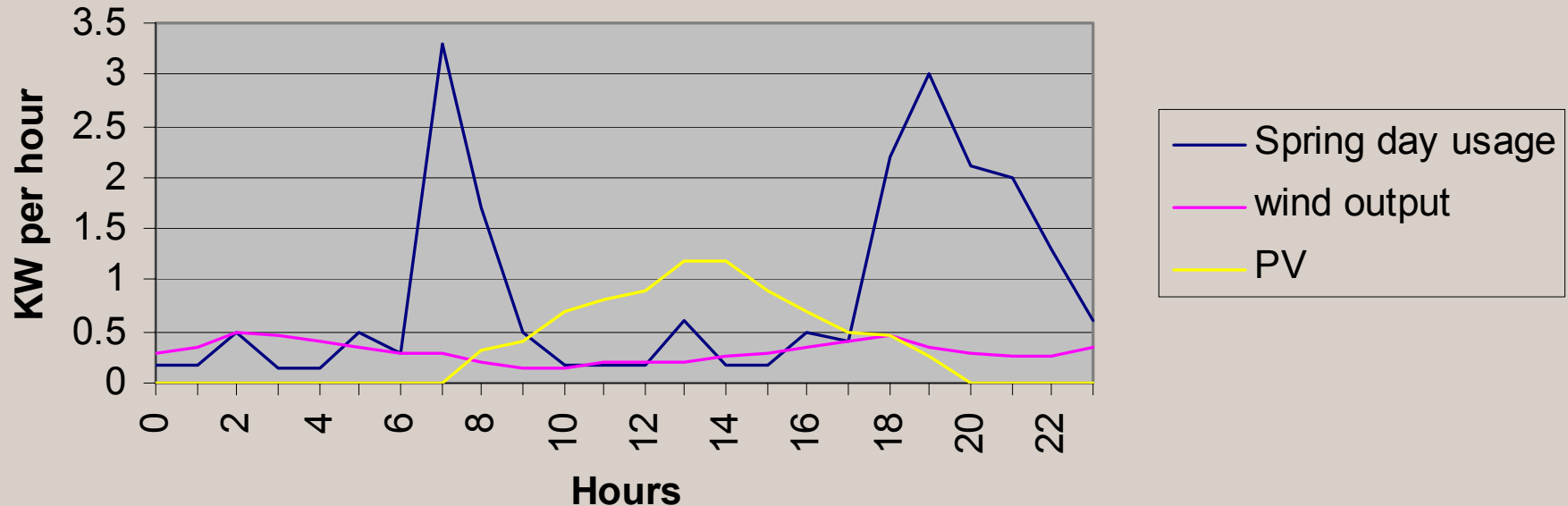
# *Why is net metering needed?*

- For small power production low cost measurement and simplicity are key
- Small power production relative to consumption cannot justify the additional administrative and metering cost of typical customer power sales arrangements
- Customer production vs. consumption vary

# *Electrical Energy Output*

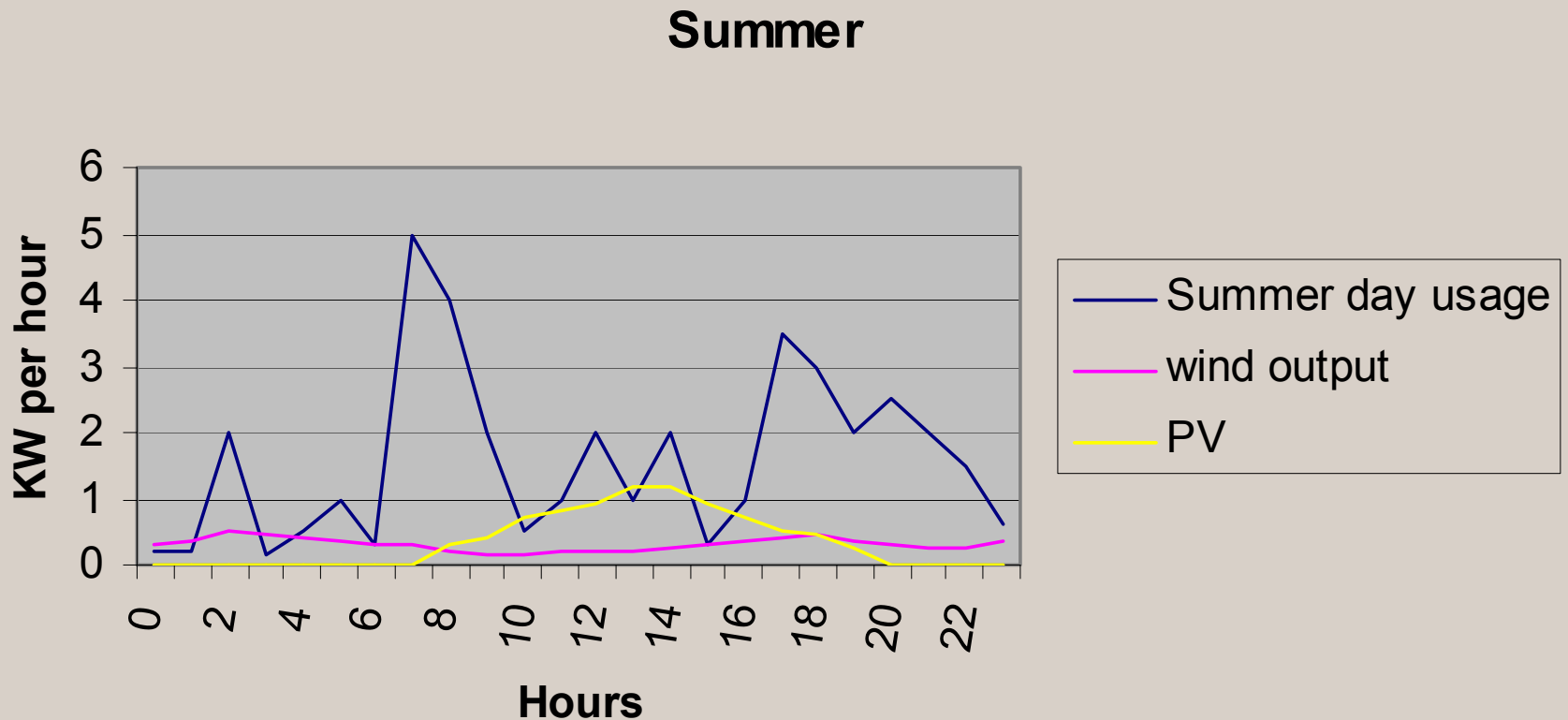
Residential consumption | 1.5 kW Wind  
Turbine and PV system

Spring

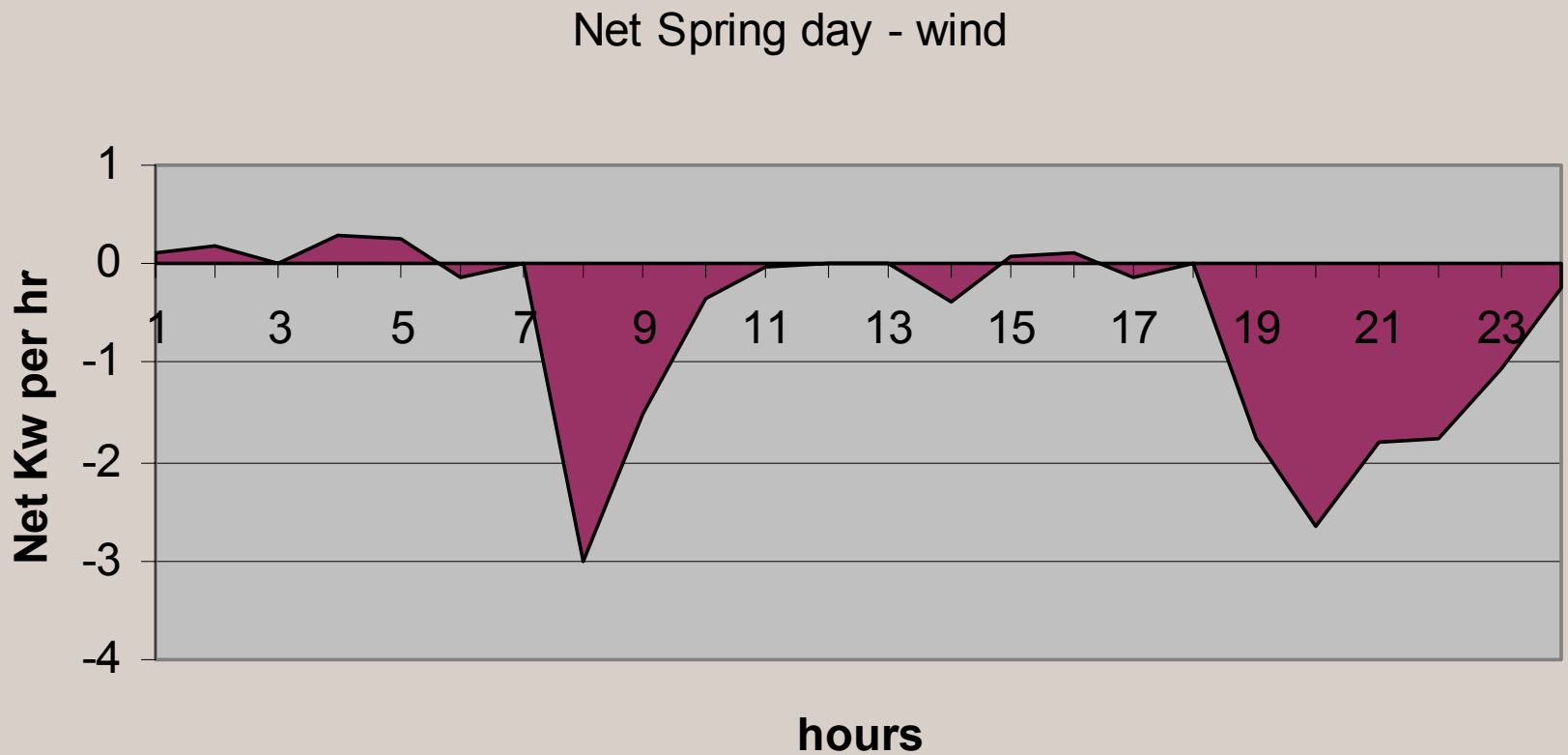


# *Electrical Energy Output*

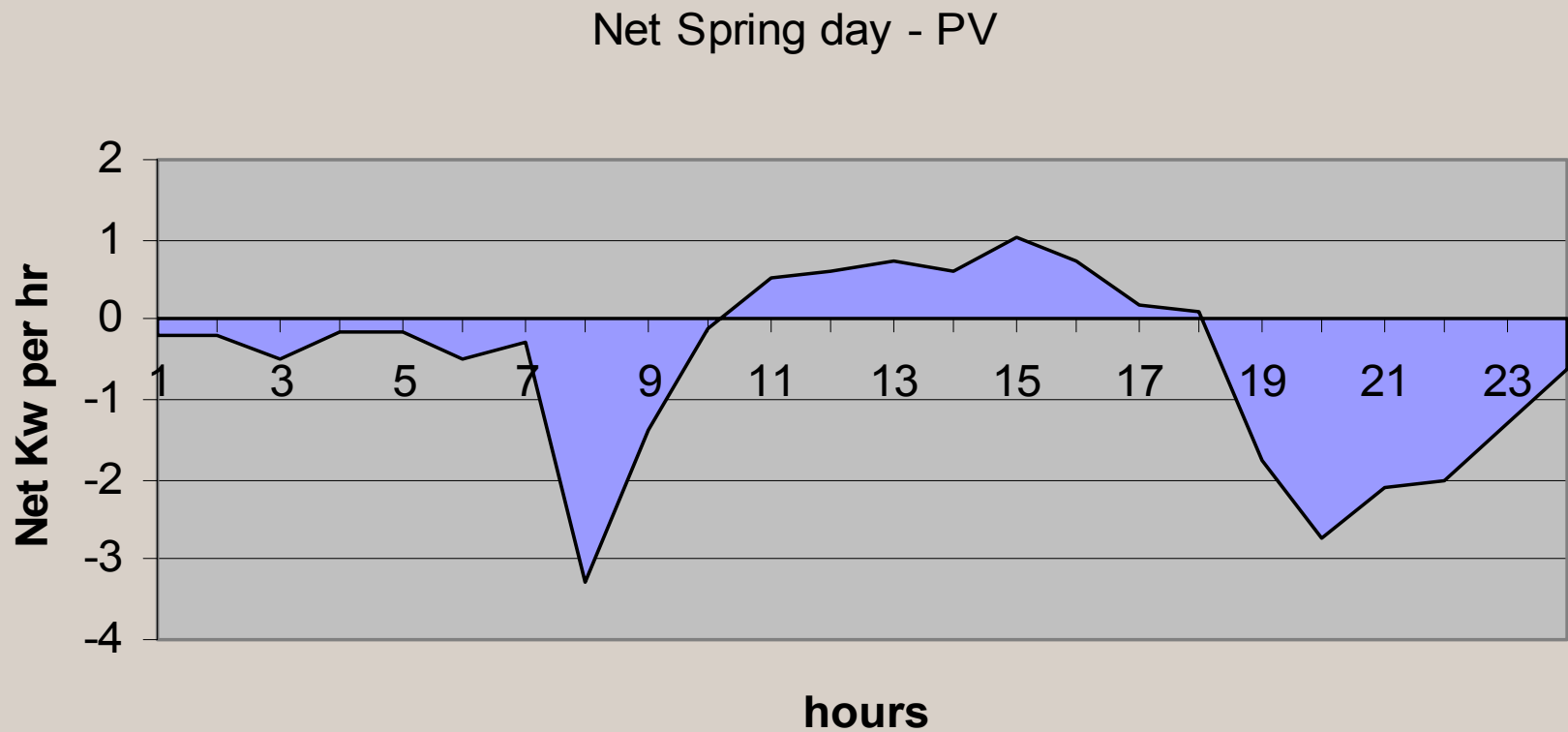
Residential consumption | 1.5 kW Wind  
Turbine and PV system



# *Net Electrical Consumption - wind*

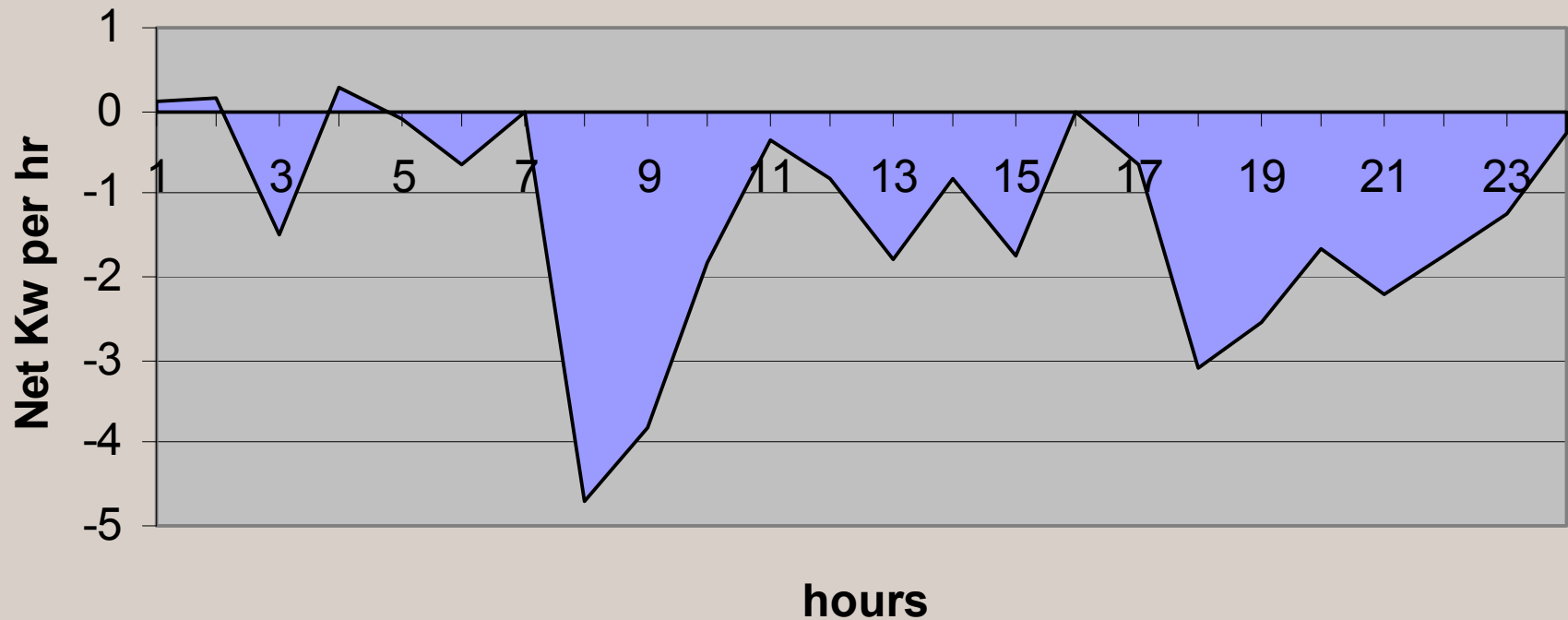


# *Net Electrical Consumption -PV*



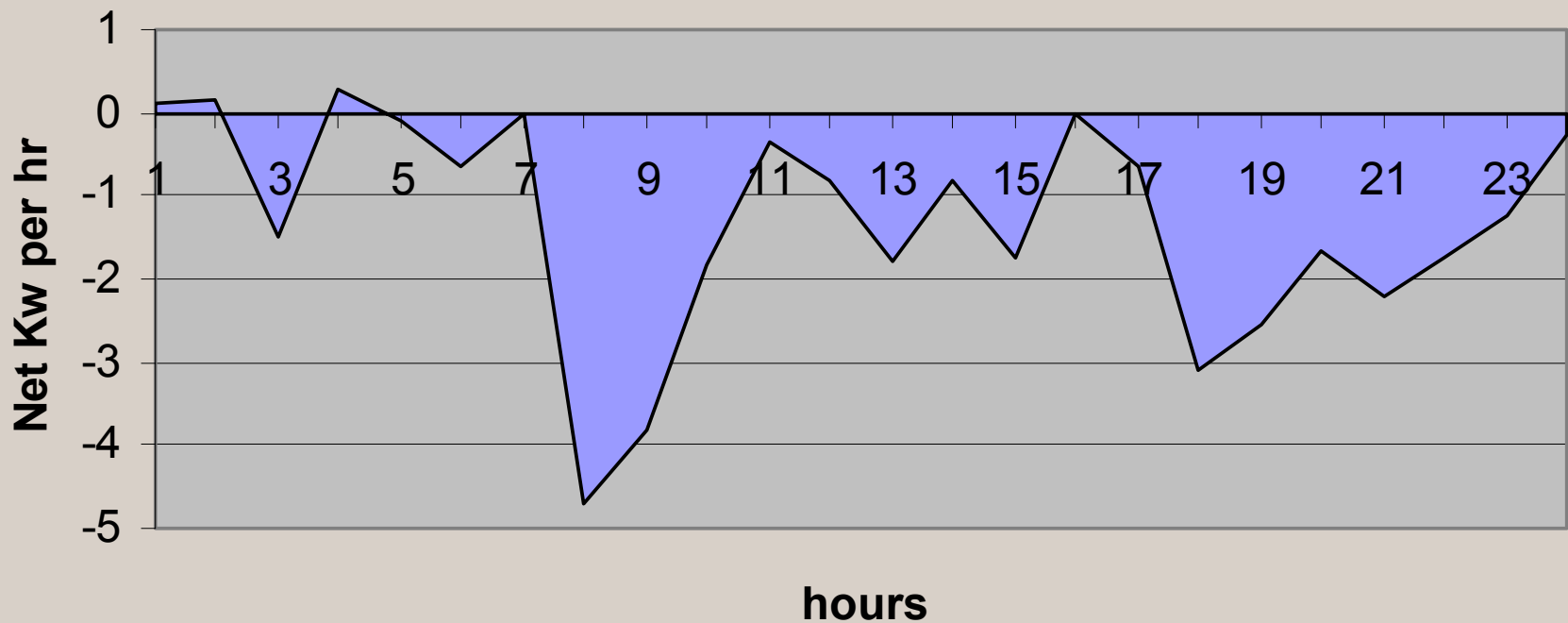
# *Net Electrical Consumption - wind*

Net Summer day - wind



# *Net Electrical Consumption -PV*

Net Summer day - wind



# *Net metering Economic issues*

- Fundamentals of regulatory rate policy suggest that providing full retail credit to a customer generator is overcompensation
- Utilities have fixed costs
- These fundamentals DO NOT apply to small customer generation. Application represents a lose-lose proposition



# *Net metering Economic issues*



- Customer
  - For a small system (1-5 kW) periods of excess production over consumption may be < \$10 per month.
  - Requiring interconnection fees, extra equipment, administrative costs, meter charges and customer charges can eliminate entire benefit.

# *Net Metering Economics*



- Utility
  - Concerned about lost revenues
  - Solution more expensive than problem
    - Cannot undertake dual metering and administration costs for less than \$10 per month -- other rate payers would subsidize
  - Cap on participation limits economic liability

# *Net Metering Economics*



- Other customers/rate payers
  - Total direct “subsidy” is small
    - 5 to 50 cents per year
  - Benefits from offset power plant construction
    - fuel diversity/stability
    - reliability (lowered capacity margins)
  - Environmental benefits

# *Net metering Economics - Electricity Competition*



- Unaffected by open access retail competition
- Customer production from on-site generator takes on proxy for competitive supplier if net metered
- If low cost supplier, then all consumers share in the benefit

# *Federal Activities - net metering*



- Legislation
  - Senate Bill 517 (amended)
  - House Bill 3089

# *Senate Bill 517 -- the Energy Bill*



- Commercial net metering up to 500kW
- Residential net metering up to 500 kW !!!
- Fuel cells, CHP (comm.) solar, wind, biomass, geothermal (landfill gas).
- States must consider adopting the net metering interconnection guidelines within one year of enactment

# *Senate Bill 517 -- the Energy Bill*



- General interconnection guidance (“all applicable” IEEE, NEC, UL)
- Net metering is not spelled out specifically to require one meter.
- There is no guidance as to why a state should or should not adopt these standards.
- Will it impact existing state net metering rules?

## *House Res. 3089*

- States have one year to implement net metering otherwise FERC can require
- Net metering, but single meter not required
- Fuel Cell, wind, solar or biomass
- Could include additional charges if “just and reasonable”
- Interconnection stds. left largely up to states



# *State Net Metering Activities*



- 36 States have enacted net metering policies
- Most by legislation
- Some by utility regulators
- Some by individual utilities (Colo.)
- Varying degrees of success
  - Calif. clearly the most successful

# *State Net Metering*

- Calif. was the first and has the best from the consumer's perspective (1 MW)
- States vary on who can net meter. Majority trends: 10-25 kW | solar mostly then all renewables | usually have total caps 0.1% to 2%
- Two newest: Kentucky (10kW res., 25kW comm.) and Utah (passed legis.)

# *State Net Metering*



- For an up to date listing of state interconnection rules, net metering offerings and other incentives visit:
- [www.irecusa.org](http://www.irecusa.org)

# *Components of a successful DG policy*

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- Simple interconnection standards for all types of DG
- Net metering for small DG (may discourage certain types)
- Incentives for renewable energy

# *Emerging DG trends*



- Green Tags
- Technologies
  - Inverters
  - Fuel cells
  - PV
  - Wind



*That's all Folks...*